

London this year. On Sunday afternoon, January 13, about 4.5 p.m., while sitting in my rooms here along with my wife and my brother, I was suddenly sensible of a severe earthquake; I pulled out my watch to take the exact time, and while I was in the act of drawing their attention to the phenomenon, my wife, who has experienced with myself, numerous shocks in the Malay Archipelago, exclaimed also that an earthquake was occurring. My brother distinctly felt the shock, but was unaware what it was. It was composed of two severe shocks, with an interval of short duration between them. The house was quite still, and nothing was passing in the street, nor for more than twenty minutes did any carriage come along it. Being accustomed for several years to observing earthquake movements, I am perfectly confident of the occurrence of an earthquake at that time; and in the hope that some other observer has noted the fact, I have sent this note to NATURE.

HENRY O. FORBES

87, Queen's Crescent, Haverstock Hill, N.W.,
April 22

MR. E. B. KNOBEL, F.R.A.S., F.G.S., writes to the *Times* from Bocking, near Braintree:—"A sharp shock of earthquake was experienced here at about 9.18 a.m. this morning. A slight trembling was first felt, followed by an oscillation sufficient to make one stagger and cause some alarm. Among the incidents which resulted, house bells were set ringing, one or two doors of cottages burst open, and clocks stopped. The safety-valve of a boiler was lifted and steam blown off for an instant. The phenomenon lasted from two to three seconds, though perhaps the latter estimate is slightly in excess of the true duration of the oscillation. The following facts may be useful in determining the direction of the wave. Three pendulum clocks in different houses stopped, the line at right angles to the plane of oscillation of the pendulum being in all cases north-west and south-east. Pendent gaslights in a factory were caused to sway in the same direction, north-west and south-east. A door was burst open, the position of which when closed was north by west and south by east. These facts would indicate a south-easterly origin of the earthquake wave."

A CORRESPONDENT at Southend states that the wave seemed to travel from north to south, while in the neighbourhood of Oxford Street the direction seemed east to west, and so also at Gray's Inn, where a correspondent felt as if the bed were slipping from under him. Doubtless by next week we shall have fuller and more precise details.

NOTES

THE final meeting of electricians to determine the practical units of electricity and light assemblies in Paris on the 28th inst., when England will be represented by Sir William Thomson, Messrs. Preece, Hughes, Adams, Jenkin, Foster, Graves, and Hopkinson and Capt. Abney. The Congress is expected to last or several days.

DR. KOCH and the members of the German Commission sent last autumn to Egypt and India to investigate the cause of cholera have left Alexandria on their return to Europe.

THE Senate of Glasgow University have resolved to confer the degree of LL.D. on Prof. Osborne Reynolds, Victoria University, and Mr. Thomas Muir, High School, Glasgow.

AT Ekhmeem, a large provincial town of Upper Egypt, situate about half way between Assiout and Thebes, Prof. Maspero, returning from his annual trip of inspection up the Nile, has just found a hitherto undiscovered and unplundered necropolis of immense extent. As far as has been yet ascertained, the necropolis dates from the Ptolemaic period; but as the work of exploration proceeds, it will probably be found that it contains more ancient quarters. The riches of this new burial field would

meanwhile seem to be almost inexhaustible. Five great tombs or catacombs already opened have yielded 120 mummies, and within the short space of three hours Prof. Maspero verified the sites of over 100 more similar catacombs, all absolutely intact. The necropolis of Ekhmeem, at a rough estimate, cannot contain fewer than five or six thousand embalmed dead. Of these perhaps not more than 20 per cent. will turn out to be of archaeological or historical value; but the harvest of papyri, jewels, and other funeral treasures cannot fail to be of unprecedented extent. Ekhmeem is the ancient Khemnis—the Panopolis of the Greeks. Its architectural remains are insignificant.

THE Granton Zoological Station was formally opened last week; the ceremony was to have been performed by Prof. Ernst Haeckel, but illness prevented him from coming to Edinburgh, as he had intended, to be present at the tercentenary celebration.

THE annual meeting of the Iron and Steel Institute will be held on Wednesday, April 30, and May 1 and 2, at the Institution of Civil Engineers, 25, Great George Street, commencing each day at 10.30 a.m. The list of papers and subjects for discussion is as follows:—Adjourned discussions: (1) On the tin plate industry, by Mr. E. Trubshaw, Llanelly; (2) on the coal-washing machinery used by the Bochumer Verein, by Mr. F. Baare, Bochum; (3) on the manufacture of anthracite pig iron, by Mr. J. Hartman, Philadelphia, U.S.A. Adjourned papers: (1) On recent results with gas puddling furnaces, by Mr. R. Smith-Casson, Brierly Hill; (2) on a new form of gas sampler, by Mr. J. E. Stead, F.C.S., Middlesborough. New papers: (3) On the use of raw coal in the blast furnace, by Mr. I. Lowthian Bell, F.R.S., &c., Rounton Grange, Northallerton; (4) on the behaviour of armour of different kinds under fire, by Capt. C. Orde-Browne, Lecturer on Armour at Woolwich; (5) on recent progress in iron and steel shipbuilding, by Mr. William John, Barrow-in-Furness; (6) on the most recent results obtained in the application and utilisation of gaseous fuel, by Mr. W. S. Sutherland, Birmingham. In addition we believe that a paper may be expected on the important subject of iron or steel sleepers, as now used largely in Germany, in place of the timber sleepers with which we are all familiar; and possibly papers on other subjects may be at the last moment forthcoming. It will be seen that the programme presents several features of interest. Mr. Lowthian Bell, we have every reason to believe, will exhibit the conditions attending the use of raw coal instead of coke in the blast-furnace in a clearer and more satisfactory form than has ever before been achieved. Again, the great duel being fought out between armour and guns is always a matter of keen interest, and Capt. Orde-Browne's position as a skilled and yet independent observer of the struggle gives him a special right to speak upon it. He will be able to give the last results obtained with the compound or steel-faced armour now coming so much into fashion. The ordinary business of the meeting includes the election of members, reading of the Council's report, and the presentation of the Bessemer gold medals to Mr. E. P. Martin, late of Blaenavon, but now General Manager of the great works at Dowlais, and to Mr. E. Windsor Richards, General Manager to Messrs. Bolckow, Vaughan, and Co., Middlesborough, to whom we are indebted for the practical realisation of the basic process of steel-making.

COL. KINCAID, Political Agent, Bhopal, writes to us under date March 30:—"We have had a renewal of the after-glow here lately, but not nearly so intense as we had in September October, November, and part of December. The natives of the country have naturally been much exercised by the prolonged phenomenon, and still believe it portends war and tumult." Col. Kincaid also sends us an extract from Malcolm's "History of Persia," referring to an "extraordinary change in the appearance of the sun" in the year 1721, which greatly alarmed the Persians of the period.

MR. SYDNEY HODGES, of Ealing, sends us a letter he has received from Mr. C. St. Barbe, of Wellington, New Zealand, dated February 17, on the green moon. "The phenomenon of a green moon," Mr. St. Barbe writes, "has been distinctly visible here during the last week or two. The colour was sufficiently decided to attract the attention of many people, and the local journals took notice of it. The moon at the time was east of north (though very little), while the crimson after-glow was in the south-west, and consequently at the back of an observer looking at the strange colouring of the moon. I am not aware whether these positions would have anything to do with the question of complementary colours, as I know nothing about such matters, and I am unfortunately unable to say whether the green tint appeared on the moon before the crimson after-glow appeared, as the latter has become such a commonplace occurrence here as hardly to be noticed." Mr. Hodges has also received a letter from his son, who reached New Zealand from Calcutta on February 13. In it he says: "I don't know whether you heard of the volcanic eruptions in Java last September. To show what a quantity of stuff was thrown up, we were sailing for *twelve days* through a sea of pumice-stone. You could see nothing else as far as the horizon on every side, and this four months after the eruption."

DR. L. WALDO, *Science* states, has just completed the erection of a normal clock at the Yale College Observatory, to be used as a mean-time standard in the horological work of that institution. The movement and pendulum are parts of the gravity escapement clock built by Richard Bond (No. 367), and which had a phenomenal record under Mr. Hartnup at Liverpool, and later under Prof. W. A. Rogers of Cambridge. The case, from Dr. Waldo's designs, is built of cast-iron, with planed back and front, to which are clamped the plate-glass doors. The entire case rests upon two brick piers, which rise to the height of the movement, and insure stability to the pendulum suspension. Thermometers, a barometer, and a cup of calcic chloride are placed within the case, which can be exhausted to any barometric pressure desired by an air-pump attached to its side. The escapement and arc of vibration can be observed and adjusted with the greatest accuracy. The clock is erected in the clock-room of the Observatory, which was specially built to secure uniformity of temperature.

CAPTAIN BLAKISTON, who has been resident in Japan for more than twenty years, has recently issued an amended list of the birds of that country, with the ornithology of which he certainly possesses a better practical acquaintance than any living man. The list is founded on a previous catalogue, published in 1882 by Capt. Blakiston and Mr. H. Pryer, but the species are now arranged geographically, so as to show the distribution of birds through the different islands of Japan. The author draws attention to the natural division in the fauna of Japan, which is marked by the Strait of Tsungaru, to the southward of which the true Japanese avifauna is emphasised, while north of this strait the avifauna is Siberian in character.

THE following meetings of the Society of Arts have been arranged:—Ordinary meetings (on Wednesday evenings)—April 30, "The New Legislation as to Freshwater Fisheries," by J. W. Willis-Bund. May 7, "Bicycles and Tricycles," by C. V. Boys. May 14, "Telpherage," by Prof. Fleeming Jenkin, F.R.S. May 21, "Telegraph Tariffs," by Lieut.-Col. Webber, R.E. May 28, "Primary Batteries for Electric Lighting," by I. Probert. In the Foreign and Colonial Section the following paper will be read on April 29, "The Transvaal Gold Fields; their Past, Present, and Future," by W. Henry Penning. In the Applied Chemistry and Physics Section on May 8 a paper will be read on "Cupro-Ammonium Solution and its Use in Waterproofing Paper and Vegetable Tissues," by C. R. Alder

Wright, F.R.S., D.Sc.; and on subsequent evenings in the Indian Section the following papers will be read:—"Economic Applications of Seaweed," by Edward C. Stanford, F.C.S. May 9, "Indigenous Education in India," by Dr. Leitner. May 30, "Street Architecture in India," by C. Purdon Clarke, C.I.E. This paper will be illustrated by means of the oxy-hydrogen light.

DURING the next few weeks the following Penny Lectures will be delivered on Tuesday evenings at the Royal Victoria Coffee Hall, Waterloo Road:—April 22, "Camping out on the Thames," by the Rev. P. H. Wicksteed. April 29, "A Visit in the *Sunbeam* to the West Indies," by Sir Thomas Brassey, M.P. May 6, "Ice, and its Work in Earth-shaping," by Dr. W. B. Carpenter. May 13, "Fire, Electricity, and other Forms of Power," by Mr. Vernon Boys. May 20, "A Working Man's Dinner," by Prof. H. G. Seeley. May 27, "The Recent Eruption of Krakatā," by Mr. J. Norman Lockyer.

WE have received two pamphlets on the vivisection question, viz. "Vivisection in its Scientific, Religious, and Moral Aspects," by E. P. Girdlestone (Simpkin, Marshall, and Co., pp. 68, price one shilling), and "The Utility and Morality of Vivisection," by G. Gore, LL.D., F.R.S. (F. W. Kolkman, 2, Langham Place, W., pp. 32, price sixpence). These pamphlets are alike in that their authors argue the question on general grounds of common sense. The essay by Mr. Gore is issued by the Association for the Advancement of Medicine by Research, and is an admirable contribution to the subject of which it treats. Not being himself a physiologist, Mr. Gore's pleading is of all the more force from its non-professional character; while the fact of his being so busy a worker in other departments of science, as well as a man who has made a special study of the methodology of research, or "the art of discovery," enables him to speak not only with authority, but with unusual lucidity. The calmly forcible style in which he writes contrasts favourably with the hysterical vituperation which he quotes from the other side. This pamphlet ought to be read by every one who desires to obtain a rational as well as a truly moral view of the subject.

THE fourth edition of Henfrey's "Elementary Course of Botany" will be published by Van Voorst early in May. The morphology of flowering plants has been revised and added to by Dr. Maxwell Masters, who has also made great additions to the physiological portions, while Mr. A. W. Bennett has rewritten the sections relating to Cryptogamia. This new edition will be still further enriched by numerous additional illustrations.

HAARLEBEN of Vienna has issued the first part of a work on the oceans and their life, entitled "Von Ocean zu Ocean, eine Schilderung des Weltmeeres und Seines Lebens," by A. von Schweiger-Leichenfeld.

AT a recent meeting of the Asiatic Society of Japan (reported in the *Japan Weekly Mail*), Mr. O. Korschelt read a paper on "The Chemistry of Japanese Lacquer." The paper opened with a brief account of the source and preparation of the lacquer, and of the conditions under which it hardens to the best advantage. The interest of the paper lay, however, in the very complete discussion of the chemical constituents of the substance, and the synthetic determination of which of these were most essential. The summary of results was given in these terms:—1. The raw lacquer juice is an emulsion which contains—(a) a peculiar acid called urushic acid (*urushi*, the native name for lacquer), (b) a gum, (c) a nitrogenous body, (d) water, and (e) a volatile acid in traces. 2. The hardening of the lacquer juice, which takes place when the latter is exposed in a thin layer of moist air of 20° to 27° C., is due to the oxidation of urushic acid into oxyurushic acid. 3. This oxidation is caused by the nitrogenous body, which is an albuminoid and acts as a ferment.

4. The oxidation is not accompanied by hydration. The water must be present only to keep the ferment in solution, which else would not act. 5. The oxidation takes place within narrow limits of temperature, ranging from about zero Centigrade to that of the coagulation of albumen. 6. The gum seems to have a favourable influence in keeping the other substances in emulsion; but in the hardened lacquer its presence is injurious, causing it, when in contact with water, to rise in blisters. 7. By a mixture of the raw juice with urushic acid, the quantity of gum present is diminished, and the dried lacquer is enabled better to resist the injurious influence of water, besides obtaining a greater transparency. 8. The admixture of more than five parts urushic acid with one part juice weakens the action of the ferment, and so deteriorates the quality of the lacquer. 9. The gum is very similar to gum-arabic, but gives a sugar with two-thirds only of the reducing power of arabinose. 10. The ferment has the composition of albumen, except that it contains much less nitrogen. 11. Diastase and the ferment in the saliva cannot replace the lacquer ferment. 12. The difference between good and bad lacquers seems to depend mainly on the relative quantities of urushic acid and water present, the inferior lacquer having less acid and more water than the superior kind. 13. The durable quality of lacquer is a property of the oxyurushic acid, which is singularly negative in its actions, resisting all solvents tried, and affected by strong nitric acid only. In the course of the discussion which followed it was observed that probably the direct effect of the investigations would be the improvement of the lacquer process, which was peculiarly a Japanese art; also that lacquer poisoning was due to the urushic acid, which only gradually disappeared during the hardening process, the best and oldest lacquers having none at all. Sugar of lead was mentioned as the best antidote for the poison.

THE last number of *Naturen* contains an interesting report by Herr L. Stejneger of the result of his last summer's exploration of Ostrof Mednij, or Copper Island, the smallest of the Komandorski group (Commodore Islands). On his arrival the chief town was found to be nearly empty, its numerous roomy and gaudily painted houses and church having been deserted while the inhabitants had gone for the fishing season to the "Lesjbitscha," or fur-seal fishing-grounds, on the other side of a rocky promontory. The dense mists which never fail at that season interfered with the naturalist's field work, but he was so fortunate as to discover a new species of *Anorthura*, differing equally both in form and colouring from the earlier described *A. alascensis* of Prof. Baird, and from the Japanese *A. fumigata*, which is believed to belong also to the Aleutian Islands. Herr Stejneger, who has given this new form the name of *Troglodytes (Anorthura) pallescens*, considers that, although essentially the same as its Norwegian representative, it is still more closely allied to the Eastern Central Asian forms. Since his visit to Copper Island Herr Stejneger has found on Behring's Island another *Anorthura*, which differs widely from *A. pallescens*, and which he believes may prove to be the same as *A. fumigata*, common in Kamchatka. *A. pallescens* is of frequent occurrence on Copper Island. It builds its nest in the clefts of rocks at inaccessible points, and in the sound of its note, as well as in its general habits, it resembles its European kindred. The rosy finch (*Leucosticte griseinucha*), supposed to be American, was found on the Aleutian Islands, and has not been observed, as far as we know, in any other part of the Old World. Its brilliant colouring, hoarse, unmelodious song, and its preference for steep, inaccessible, rocky peaks which abound on Copper Island, make it one of the most characteristic of the local birds. Herr Stejneger has largely availed himself of the opportunities opened to him of studying the various representatives of Otariidæ and Phocidæ, which abound on the Aleutian shores, and in his paper on *Callorhinus ursinus* (the Kólik, sea-cat of the

Russians, and well known as the fur-seal of the American and English traders), he has given the readers of *Naturen* an extremely interesting and comprehensive description of the appearance, habits, and commercial importance of these valuable animals. He graphically describes the forcible tactics employed by the older seals, "Sichatchi" (Russ. husbands), in keeping the juniors, "Cholustjaki" (bachelors), within their allotted grounds, and supplies many hitherto unknown details concerning distinctive characteristics dependent upon differences of age, &c.

THE last number (thirtieth) of the *Mittheilungen der deutschen Gesellschaft für Natur und Völkerkunde Ostasiens* (Yokohama) commences with an article on mines and mining in Japan, by Herr Metzger—the third important work on this subject published by Germans. The writer, who has been for five years at the copper mines at Ani, professes merely to supplement the previous writings of his countrymen. Herr Metzger's account of Japanese practical mining is somewhat melancholy reading; on all hands he finds ignorance, incompetence, waste. There is a total absence of technical officials, everything appears to be in the hands of contractors, the mining law is in a most unsatisfactory condition, and the position of the foreign mining engineer is such that he can do little to remedy evils which he sees plainly. In this respect the complaint is everywhere the same. "The scope of the foreigner is much less than might be expected under the circumstances. It seems at present to be the full intention of the Japanese to do everything themselves; and at the most to use their Europeans as advisers, although their contracts call them engineers, &c. It not unfrequently occurs that foreigners get the impression that the advice of Japanese of the lowest rank, with or without technical training, is of equal weight with their own." Herr Metzger further alleges that since Europeans have been withdrawn the production of the gold mines of Sada has considerably diminished. He asserts that by avoiding the extraordinary waste caused by ignorance and mismanagement, the mineral production of the whole country could be increased by at least fifty per cent. Herr Lehmann writes on the indoor games of the Japanese. From the reports of the meetings it appears that the capital of Japan had its Fisheries Exhibition last year. There were 15,205 exhibitors—an unexpectedly large number; and, as a consequence, the Exhibition was divided into forty-seven separate exhibitions, corresponding to the various administrative divisions. This method rendered a journey through the Exhibition wearisome by constant repetition, and added greatly to the difficulties of a systematic study of the exhibits, which were not lessened by the absence of a catalogue. The number of articles connected with fishing amounted to 3967, while the various goods made from fish and water plants reached 6474. The fishing population of Japan is given at 1,601,406. Some interesting information respecting the rearing of fish in Japan is also given.

THE Tiflis *Izvestia* contains an interesting paper on the population of the Caucasus, a new census having been made in the course of the year 1882 in several of the larger provinces of the country. It appears from this census, although incomplete, that the population has much increased since the last census of 1877. In 1867 the whole population of the Caucasus was reckoned at 4,661,800; it rose to 5,391,700 in 1876-77. It is now more than 6,500,000—the total being reckoned at 6,449,850—which figure is still considered below the reality. This large increase of more than 1,200,000 in five or six years is partly due to the recent annexations (162,980 in the province of Kars, and 92,450 in the district of Batoum), to immigration, to natural increase, and to the incompleteness of the former census. As to the natural increase, due to the surplus of births over deaths, it is estimated at an average of 13 per thousand every year in the Government of Tiflis (1875 to 1880), and at 12 per thousand in

the Government of Erivan. Altogether, the mortality is, however, very great, and it is compensated only by a great number of births. As to the density of population, the 224,221 square kilometres occupied by the Northern Caucasus have 10.3 inhabitants per square kilometre, which figure reaches as much as 13.6 in Transcaucasia (248,445 square kilometres), where the density of population is the same as in European Russia. The Governments of Kutais (the valley of the Rion), Erivan, and Tiflis have respectively 33.6, 20.8, and 17.8 inhabitants per square kilometre.

AMONG the recent additions to Chinese scientific literature are translations of Margutti's "Elementary Chemistry" and Fresenius's "Chemical Analysis." These works have been translated into Chinese by M. Billequin, one of the professors of the Jung Wên Kwan, or Foreign College, at Peking.

THE Secretary of State for India in Council has appointed Mr. David Hooper, F.C.S., of Birmingham, to the Nilgiri Government Cinchona Plantations in the Madras Presidency.

THE additions to the Zoological Society's Gardens during the past week include a Ludio Monkey (*Cercopithecus ludio*) from West Africa, presented by Mr. F. W. Robinson; a Macaque Monkey (*Macacus cynomolgus* ♂) from India, presented by Mr. E. Drew; a Vulpine Phalanger (*Phalangista vulpina*) from Australia, presented by Mr. J. C. Martin; a Central American Agouti (*Dasyprocta isthmica*) from Central America, presented by Mr. Hugh Wilson; a Herring Gull (*Larus argentatus*), European, presented by Mr. Thomas Daws; a Common Viper (*Vipera berus*), British, presented by Mr. H. German; a Burchell's Zebra (*Equus burchelli* ♀) from South Africa, three Michie's Tufted Deer (*Elaphodus michianus* ♂ ♀ ♀), four Darwin's Pucras (*Pucrasia darwini* ♂ ♂ ♂ ♀), an Elliot's Pheasant (*Phasianus ellioti* ♂) from China, deposited; three Corn Buntings (*Emberiza miliaria*), British, purchased.

OUR ASTRONOMICAL COLUMN

SOUTHERN COMETS.—Dr. Oppenheim of Berlin has published elements of the comet discovered by Mr. Ross of Elsternwick, Victoria, on January 7, founded upon the Melbourne observations in *Astron. Nach.*, No. 2579, though, as he remarks, they were calculated with difficulty, owing to the existence of three oversights in the seven positions there given; hence their connection for an orbit would involve a troublesome tentative process. The position for January 17 is in error nearly two degrees.

Mr. Tebbutt has also computed elements from his own observations at Windsor, New South Wales, on January 19, 23, and 28, which represent closely the observation on February 2, the last he was able to obtain, the comet having become very faint; on January 19 he had considered it just beyond naked-eye vision. He remarks upon the discordance of his elements with those calculated by M. Barachi of the Melbourne Observatory, and observes: "I cannot account for these discrepancies, unless there be some error in the Melbourne data." We subjoin both orbits:—

	Tebbutt Perihelion Passage, 1883, Dec. 25.30038 ...	Oppenheim Dec. 25.3027
Longitude of perihelion ...	125 44 24 ...	125 46 12
" " ascending node ...	264 24 0 ...	264 25 14
Inclination ...	65 0 55 ...	65 0 51
Log. perihelion distance ...	9.491046 ...	9.49094
Motion retrograde.		

The time of perihelion passage is for the meridian of Greenwich, and the longitudes are referred to the mean equinox of 1884.0. It will be seen from the close agreement of the two orbits how completely Dr. Oppenheim succeeded in eliminating the Melbourne errors from his work.

In a communication to the *Observatory* of the present month Mr. Tebbutt refers to a notice in the Sydney journals copied from a Tasmanian newspaper, reporting that a bright comet had been seen at New Norfolk at 4 a.m. on December 27, bearing about east, and a few degrees above the horizon; he had searched for

it in the morning sky without success. In the *Sydney Morning Herald* of March 5, Mr. Tebbutt writes:—"Within the past few days I have received, through Commander J. Shortt, R.N., the Meteorological Observer at Hobart Town, communications respecting a fine comet which was seen in Tasmania on December 25 and 27 in the morning sky. It is described as rising above the eastern horizon a few minutes before the sun; and I am strongly inclined to the opinion that this is no other than the comet whose elements I have just communicated" (the comet found by Mr. Ross). There are difficulties, however, in the way of accepting this identification, judging from such information as we have to hand. The great increase of light near perihelion passage is not explained by the elements of the comet of January 7, which by theory would only have possessed five times the intensity of light that it had at the first Melbourne observation on the evening of January 12.

THE OBSERVATORY OF PALERMO.—In *Pubblicazioni del Real Osservatorio di Palermo, anni 1882-83*, Prof. Cacciato, the director, has collected a large number of interesting observations made chiefly in the year 1882. Prof. Ricco's astro-physical observations of the planet Jupiter extend from December 1881 to June 1883, and his descriptions of the appearance of the disk are accompanied by eighteen well-executed tinted lithographs. An extensive series of observations of the great comet of 1882, also illustrated, follows; it was last perceived with difficulty on April 7, 1883. After the conjunction of the comet with the sun it was again sought for; with a power of 110 on the refractor, and in the best condition of atmosphere, the search was unsuccessful on three evenings in September. There are other cometary and planetary observations and an appendix with the meteorological results obtained at the auxiliary station of Valverde.

GEOGRAPHICAL NOTES

THE meetings of the International Polar Conference began in Vienna last week under the presidency of Herr Heinrich Wild, the Director of the Physical Central Observatory of St. Petersburg. In his address the President praised the great merits of Count Wilczek with regard to Polar research, referred to the lamented death, since the last conference, of the Secretary of the Polar Commission, Capt. Hoffmeyer of Copenhagen, and finally gave an outline of the work done since the St. Petersburg meeting by the various expeditions and observing stations. Herr R. Müller, Director of the Hydrographic Office at Pola, was elected secretary in the place of Capt. Hoffmeyer, deceased. The principal subject discussed at the first meeting was the determination of the minimum extent to which each expedition party is bound to work out and publish its own observations at its own expense, and the establishment of a universal form of publication of results for their easier comparison. First of all the meteorological observations were discussed in this regard. The debate turned on the uniform way of noting down the obligatory observations at each station, i.e. the observations of temperature, atmospheric pressure, humidity, wind, clouds, hydro-meteors, rainfall, and temperature of the ground, snow and ice. Among those who have arrived at Vienna are the following:—MM. R. Lenz (Professor at the St. Petersburg Technological Institute), H. Mohn (Director of the Christiania Meteorological Institute), R. H. Scott (Director of the London Meteorological Office), Lieut. P. H. Ray of Washington, Lieut. E. von Wohlgemuth (Vienna), Herr Wijkander, Prof. Guido Cora (Turin University), Capt. Dawson (Chief of the Fort Rae Expedition), Dr. Giese of Hamburg (Chief of the German Antarctic Expedition), H. Paulsen of Copenhagen (Chief of the Danish Polar Station at Godthaab), Lieut. Payen (Paris), Dr. Snellen (Director of the Utrecht Meteorological Observatory), Aksel S. Steen (of the Christiania Meteorological Institute), Count Hanns Wilczek (Vienna). The following were expected to arrive shortly:—Prof. G. Neumayer of Hamburg (Director of the German Seewarte), Prof. E. Mascart (Director of the Paris Meteorological Central Bureau), Dr. Börger (of the Kiel Marine Observatory), Prof. Lemström (Helsingfors), E. Riese (Chief of the Finnish Polar Station at Sodankylä).

THE *St. Petersburg Zeitung* contains the following details concerning the expedition which Col. Prjevalsky is now leading in Thibet. The points of departure of the expedition were Kiakhta and Ourga. From thence it was to go to Tsaidam by Alashan and Koko-Nor. In Tsaidam, at the foot of Burkhan Buda, it